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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of

Advanced Television Systems and
Their Impact Upon the Existing
Television Broadcast Service

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MM Docket No. 87-268

**REPLY COMMENTS OF THE ELECTRONIC INDUSTRIES ASSOCIATION
AND THE EIA ADVANCED TELEVISION COMMITTEE**

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EXECUTIVE SUMMARY

The parties to this proceeding overwhelmingly agree that the adoption of a single transmission standard for digital television ("DTV") broadcasting is the only way to ensure an expeditious transition to DTV while preserving our free, over-the-air broadcasting system. The example of AM stereo demonstrates that, in the absence of a single agreed-upon transmission standard, the success of a new, universally accepted broadcast technology is not likely. Just as the NTSC standard played a critical role in the development and broad proliferation of broadcast television, a single standard is necessary to bring digital television to the American public swiftly and inexpensively.

The record of this proceeding also demonstrates that most commenters believe that the standard recommended by the Advanced Television Systems Committee (the "ATSC DTV Standard" or "Standard") will be compatible with computers and alternative distribution media. The ATSC DTV Standard is the product of a nine-year, open process in which all interested parties took part. Although primarily a television broadcast transmission standard, the Standard also meets the myriad needs of the consumer electronics, computer, film, and telecommunications industries. The Standard's success can be measured by the broad industry consensus in favor of its adoption by the Commission.

Most commenters urge the Commission to adopt the ATSC DTV Standard in its entirety. In view of the enormous challenge posed by the migration to DTV, the Commission should reject suggestions that it adopt other standards that have not faced the rigorous scrutiny of the Commission's Advisory Committee on Advanced Television Service nor earned broad industry consensus -- as the ATSC DTV Standard has.

Most commenters similarly do not see a need for the Commission to "sunset" or place a time limit on the ATSC DTV Standard. An arbitrary time limit would only dilute the confidence and certainty that adoption of the ATSC DTV Standard would otherwise encourage in the marketplace.

The Commission should also reject suggestions that it impose mandatory performance or reception standards on digital television receivers. The dynamic consumer electronics marketplace will ensure that digital sets display the same high level of performance that consumers have come to expect in their NTSC receivers.

Numerous commenters stress the significant economic benefits that would result from the rapid adoption of the ATSC DTV Standard. Prompt action by the Commission will help establish the ATSC DTV Standard as the global standard for digital broadcasting, thus spurring the American economy in terms of manufacturing, trade, technological development, international investment, and job growth.

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The Electronic Industries Association ("EIA") and the EIA Advanced Television Committee ("ATV Committee") hereby reply to the comments that were filed in response to the Fifth Further Notice of Proposed Rule Making ("*Notice*") which the Commission issued in the above-captioned proceeding on May 20, 1996.¹

I. INTRODUCTION.

In their initial comments, EIA and the ATV Committee demonstrated that:

- The Commission should promptly incorporate into its rules the standard for digital television ("DTV") proposed by the Advanced Television Systems Committee ("ATSC"). Only by adopting the entire ATSC DTV Standard A/53 (the "Standard") will the Commission send a clear signal to broadcasters, manufacturers, and the public that it is safe to move forward into the age of digital television.
- The Commission should not artificially limit the longevity of the ATSC DTV Standard. A commitment by the Commission to reassess or "sunset" the Standard at an arbitrary point in time would subvert the clear message that adoption of the Standard would otherwise send to the marketplace. Instead, the Commission need

¹ See *Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, Fifth Further Notice of Proposed Rule Making, MM Docket No. 87-268, FCC 96-207 (released May 20, 1996) [hereinafter "*Notice*"].

only acknowledge its ongoing obligation to evaluate its rules and policies as the public interest may require.

- The Commission should adopt the entire ATSC DTV Standard. Adoption of a scaled-back or partial standard would deny the public the certainty that a receiver used in one viewing area would operate in another. Just as the Commission's support for the ACATS process provided the glue that kept industry committed to developing the Standard, the Commission's adoption of the Standard will keep industry on track in implementing it.
- The Commission should not adopt television receiver standards. Once the ATSC DTV Standard is in place, marketplace forces will ensure the ubiquitous availability of digital receivers and digital converters capable of receiving all DTV formats.
- The Commission should encourage industry to develop answers to interoperability issues.

The overwhelming majority of comments filed by other parties confirms the validity of these recommendations.

Although some parties propose alternatives to mandating the entire Standard, most wholeheartedly endorse the Commission's tentative decision to adopt all elements of the Standard without limitation or qualification. A majority also agrees with EIA and the ATV Committee that the ATSC DTV Standard is more than adequate to meet the interoperability requirements of computers and alternative media. Furthermore, most parties acknowledge the Standard's inherent flexibility and ability to accommodate future technological innovation. These parties agree that the Commission should regularly review, but not sunset or limit, the Standard. The majority of commenters also acknowledge that obligatory receiver standards are not needed to ensure that manufacturers produce televisions with acceptable reception performance. Many also agree that the private sector can and should be encouraged to resolve any outstanding interoperability issues subsequent to the implementation of the Standard. Given this enormous

support, the Commission should proceed to adopt the Standard consistent with each of these points.

II. MOST COMMENTERS AGREE THAT THE ADOPTION OF A SINGLE DTV TRANSMISSION STANDARD IS THE ONLY WAY TO ENSURE AN EXPEDITIOUS TRANSITION TO DTV WHILE PRESERVING OUR FREE, OVER-THE-AIR BROADCASTING SYSTEM.

The comments evidence widespread agreement that a single unified standard is essential to a smooth and expeditious transition to DTV. A single standard is absolutely necessary to provide the requisite degree of certainty for all interested parties that will allow the swift migration to DTV.²

² See, e.g., Comments of Advanced Broadcasting Systems of Canada, Inc. at 2 [hereinafter "ABSC Comments"]; Comments of Advanced Television Systems Committee at 6 [hereinafter "ATSC Comments"]; Comments of Advanced Television Technology Center at 2 [hereinafter "ATTC Comments"]; Comments of Broadcasters at 1-2 [hereinafter "Broadcasters' Comments"]; Comments of Citizens for HDTV at 5 [hereinafter "CHDTV Comments"]; Comments of Digital HDTV Grand Alliance at 5 [hereinafter "Grand Alliance Comments"]; Comments of Dolby Laboratories at 3 [hereinafter "Dolby Comments"]; Comments of Hammett & Edson, Inc. at 1 [hereinafter "H&E Comments"]; Comments of General Instrument Corporation at 2 [hereinafter "GI Comments"]; Comments of Hitachi America, Ltd. at 3 [hereinafter "Hitachi Comments"]; Comments of Lionel S. Johns, Associate Director for Technology, Office of Science and Technology Policy, Executive Office of the President of the United States at 2 [hereinafter "OSTP Comments"]; Comments of Larry Irving, Assistant Secretary for Communications and Information, National Telecommunications and Information Administration, United States Department of Commerce at 1 [hereinafter "NTIA Comments"]; Comments of Matsushita Electric Corporation of America at 2 [hereinafter "MECA Comments"]; Comments of Mitsubishi Consumer Electronics America, Inc. at 2 [hereinafter "Mitsubishi Comments"]; Comments of Phillips Electronics North America Corporation at 3 [hereinafter "Phillips Comments"]; Comments of Sony Electronics, Inc. at 7 [hereinafter "Sony Comments"]; Comments of Thomson Consumer Electronics at 4 [hereinafter "Thomson Comments"]; Comments of Zenith Electronics Corporation at 3 [hereinafter "Zenith Comments"].

A small minority, however, questions the need for the Commission to mandate a DTV standard.³ In support of their position, these detractors point to the success of businesses such as PCS, DBS and cellular, in which the Commission has declined to adopt technical standards.⁴ As the Commission has recognized, however, the circumstances of terrestrial broadcast television are entirely different from those of subscription services, in which the provider often supplies and controls the reception equipment.⁵ Specifically, the economics of free, universally available television require the existence of a mass market to receive and support the service. Such a mass market is premised upon the existence of a nationwide, seamlessly compatible network of program producers, local transmitters, and home receivers.

Free, over-the-air broadcasting can only be sustained with an agreed-upon, national broadcast standard. A single national standard ensures complete compatibility between every broadcast television station and every television set sold in the United States. As the Broadcasters note, "[t]he market simply cannot provide the coordination necessary to ensure that more than 1600 local DTV television stations broadcast to some 200 million sets, using compatible technologies with minimum interference to each other and other spectrum users"⁶ Successful introduction of terrestrial digital broadcasting will therefore depend upon

³ See, e.g., Comments of Computer Industry Coalition on Advanced Television Service at 6 [hereinafter "CICATS Comments"]. To the extent that CICATS claims to represent the views of the computer industry, note that such companies as Digital Equipment Corp. ("DEC"), Gateway 2000 Inc. ("Gateway"), International Business Machine Corp. ("IBM"), Oracle Corp., and Sun Microsystems Inc. are conspicuously absent from the CICATS membership.

⁴ See *id.* at 10.

⁵ See *Notice* at ¶ 15.

⁶ See Broadcasters' Comments at 22.

maintaining the guarantee of nationwide compatibility between broadcasters and television set owners.

Unable or unwilling to address the specific realities of over-the air broadcasting, some commenters argue against the theoretical "evils" of government-prescribed standards.⁷ One party even claims that the "Commission has all but ignored the substantial risks of government-mandated standards."⁸ These assertions are patently false. A review of the record of this proceeding demonstrates an extraordinarily careful and deliberate effort on the part of the

⁷ See, e.g., Comments of National Cable Television Association at 7 [hereinafter "NCTA Comments"]. NCTA's broad criticism of government-prescribed standards relies primarily on the statements of Dr. Bruce Owen, whose declaration is incorporated into their Comments as Attachment A. However, when referring specifically to the broadcast industry, Dr. Owen makes the following observation:

The production of television service requires intricate coordination of numerous agents operating in different locations at different stages of the industry . . . *when acts are repeated and the repeated activities of different economic agents must be coordinated, standards confer enormous benefits.*

Bruce M. Owen and Steven S. Wildman, *Video Economics* 261 (Harvard University Press 1992) (emphasis added) [hereinafter "Owen and Wildman"]. Dr. Owen also emphasizes the beneficial role of standards in promoting system-wide economies of scale:

The larger the group of consumers for television programs, the more is spent on the production of individual programs *[I]f the installed base of NTSC receivers were divided into two equal but mutually incompatible parts, the quality and variety of programs available to each would diminish.*

Id. at 288 (emphasis added).

⁸ CICATS Comments at 6-7.

Commission and industry to weigh the costs and many benefits of mandating a transmission standard for digital television.⁹

The issue of digital broadcast standards is hardly a question of first impression for the Commission. In the initial 1987 Notice of Inquiry in this proceeding, the Commission recognized the critical role played by standards in establishing our national NTSC broadcast system.¹⁰ In the 1988 Second Notice of Inquiry, the Commission continued its analysis, stating that "we believe that the public interest compels a Commission role in the development of standards with the advice and involvement of all sectors of the industry."¹¹ In the 1990 First Report and Order, the Commission concluded that "[c]onsistent with our goal of ensuring excellence in ATV service, we intend to select a simulcast high-definition television system."¹² Finally, in the most recent *Notice*, the Commission proposed to adopt the ATSC DTV Standard.¹³ Rather than being criticized, the Commission should be commended for the deliberation and analysis underlying its efforts to mandate a national digital broadcast standard.

As noted by numerous commenters, the consequences of attempting to advance a new broadcast technology without a uniform transmission standard are likely to be dire. This is most aptly illustrated by the Commission's experience with AM stereo radio.¹⁴ The

⁹ See *Notice* at ¶¶ 29-36

¹⁰ See *id.* at ¶ 22.

¹¹ *Id.* at ¶ 23.

¹² *Id.* at ¶ 26.

¹³ See *id.* at ¶ 37.

¹⁴ See, e.g., Broadcasters' Comments at 19-20; Grand Alliance Comments at 12; Sony Comments at 11.

Commission's decision to authorize competing AM stereo standards led to widespread marketplace confusion. Initial attempts to manufacture multi-standard receivers were abandoned because of cost and performance considerations. As a consequence, this once-promising technology failed to achieve its full potential. Indeed, so great was the failure of AM stereo that Congress intervened to require the adoption of a single standard, but by the momentum behind the technology had dissipated. Given the critical role of free, over-the-air television, the risks posed by a multitude of incompatible digital broadcast standards are simply unacceptable.

The broad support for the ATSC DTV Standard does not negate the need for the Commission to incorporate the standard into its rules.¹⁵ As the Broadcasters have made clear, "the widespread expectation . . . that a standard would ultimately be adopted is what made the inter-industry cooperation and competition so productive."¹⁶ This expectation was encouraged by the Commission's consistent statements that it intended to set a single broadcast standard.¹⁷ If the Commission were to reverse itself at this late date, EIA and the ATV Committee submit that the existing consensus could unravel. EIA and the ATV Committee's concern in this regard is by no means fanciful. As some of the comments make crystal clear, various industries would quickly seize such an opportunity to advance competing standards representing their parochial interests.¹⁸ The resulting marketplace confusion would severely retard the transition to DTV.

¹⁵ *See, e.g.*, Broadcasters' Comments at 20-22; Hitachi Comments at 4; Thomson Comments at 5; Zenith Comments at 4.

¹⁶ Broadcasters' Comments at 21.

¹⁷ *See Notice* at ¶¶ 22-26.

¹⁸ Recent events in the development of standards for the transmission of data within NTSC television broadcast signals illustrate the importance of the Commission's continued commitment to the standards-setting process. For several years, the National Data

Adoption of the Standard is also critical to promoting the provision of DTV over cable facilities. Of course, cable operators will be a significant provider of DTV programming. To reduce the complexity of producing cable-ready DTV receivers, the Society of Cable and Telecommunications Engineers and the Joint Engineering Committee of EIA/CEMA, NCTA and ATSC are working on compatibility standards. A companion goal is to ensure flexibility in the cable/television interface, while simultaneously minimizing the need for redundant tuners, demodulators, decompressors, etc.¹⁹ Adoption of the ATSC DTV Standard will be essential to facilitate this industry process by establishing a single broadcast standard on which to build. The Commission should therefore adopt the Standard and encourage industry to continue its ongoing efforts to ensure that cable subscribers are able to enjoy the benefits of DTV as early as possible.²⁰

Broadcast Committee ("NDBC") (comprised of the National Association of Broadcasters and EIA's sector-affiliate CEMA, the Consumer Electronics Manufacturers Association) has been evaluating proposed systems for these data transmissions. Several proponents submitted their technologies to the NDBC, likely expecting that the NDBC's selection of an industry standard would improve the successful technology's chances of being accepted as a Commission standard. Recently, however, the Commission authorized the use of several technologies -- before the industry process was completed. As a consequence, one of the major proponents saw fit to drop out of the industry process, undermining the industry's ability to evaluate all technologies equally. Thus, while the Commission has had tremendous success to date in promoting the development of the ATSC DTV Standard, the industry's recent experience with NTSC data demonstrates how quickly industry consensus can evaporate if the Commission takes actions which discourage consensus building.

¹⁹ The only function that must be separate from the television receiver is the cable operator's descrambler.

²⁰ EIA and the ATV Committee believe that there is a narrow window of opportunity for the Commission to expedite efforts to resolve cable-ready issues. If the Commission allows that window to close and industry consensus building to dissolve, the end result could be cable compatibility problems extraordinarily more intractable than those now confronting the Commission.

The existence of a single standard will also assist manufacturers in ensuring that closed captioning is successfully provided to the public via digital receivers. A DTV closed captioning standard is currently being developed by the EIA/CEMA Television Data Systems Subcommittee. This standard will comport with the ATSC DTV Standard and with the Commission's closed-captioning rules. If the Commission does not adopt a single DTV transmission standard, it will be impossible for receiver manufacturers to determine how to design closed-captioning decoders for incorporation into all television receivers (as now required). Indeed, the same problem will arise, likely in a more complicated state, in determining how to pass through closed captioning on cable systems.

The Commission has long recognized the need for a single, mandatory terrestrial broadcast standard, and the *Notice* acknowledges that this view is shared by a majority of a participants in this proceeding.²¹ Just as the NTSC standard played a critical role in the development of broadcast television, the ATSC DTV Standard should be adopted so that it can play the same critical role in bringing digital television -- with all its enhancements and capabilities -- to the American public swiftly and efficiently.

III. MOST COMMENTERS AGREE THAT THE ATSC DTV STANDARD WILL BE COMPATIBLE WITH COMPUTERS AND ALTERNATIVE MEDIA.

The majority of commenting parties, including the National Telecommunications and Information Administration, consumer groups, unions, and members of the broadcasting, consumer electronics, and motion picture industries, agree that the ATSC DTV Standard

²¹ See *Notice* at ¶ 26.

provides for interoperability with computers and alternative distribution media.²² This should come as no surprise to the Commission.

The ATSC DTV Standard is the product of a nine-year, open process in which thousands of volunteers from the telecommunications, broadcasting, computer, cable television, manufacturing, and motion picture production industries participated. With the active encouragement of the Commission, the participants specified system requirements, developed hardware, and subjected the resulting Standard to rigorous testing. During the same time frame, ACATS and its various subcommittees and working groups held more than 300 open, public meetings across the country. It is difficult to imagine a more competitive, inclusive, and fair process. Given this history, the Commission's determination that those opposing the ATSC Standard should bear the burden of persuasion as to why the Standard should not be adopted is entirely appropriate.²³

²² See, e.g., ABSC Comments at 3; ATSC Comments at 16-27; ATTC Comments at 5-7; CHDTV Comments at 10; Broadcasters' Comments at 6-15; Grand Alliance Comments at 16-27; GI Comments at 6-7; Hitachi Comments at 7-9; OSTP Comments at 1; NTIA Comments at 1-2; MECA Comments at 7-11; Comments of Motion Picture Association of America at 2-9 [hereinafter "MPAA Comments"]; Mitsubishi Comments at 2; Phillips Comments at 12-13; Sony Comments at 12-35; Thomson Comments at 9-13; Zenith Comments at 9-13.

²³ See Notice at ¶ 21.

A. The Standard Provides for Computer Interoperability.

Certain members of the computer industry have submitted comments that object to the proposed standard.²⁴ These objections are by no means new. The very same issues were repeatedly raised before, and thoroughly debated by, the ATSC. They were also fully addressed in the recommendation that was ultimately adopted without objection by the members of the Commission's Advisory Committee on Advanced Television Services ("ACATS").

Computer industry representatives, along with representatives of all other affected industries, actively participated in the ACATS process. Indeed, computer industry members of the ACATS PS/WP-4 review panel identified four technical factors that were deemed essential to computer interoperability: an all-digital implementation based on a layered architecture model; use of universal headers and descriptors; transmission of the signal in progressive scan format; and use of a flexible, packet data transport structure.²⁵ Each of these recommendations

²⁴ See, e.g., CICATS Comments at 19; Comments of Information Technology Industry Council at 2 [hereinafter "ITI Comments"]. ITI's sudden objections to the interoperability provided by the ATSC DTV Standard are surprising given its recent support for the Standard's rapid implementation:

ITI believes that the proposed ATV standard -- which is intended for terrestrial digital broadcasting -- should be promptly reviewed and implemented by the FCC. The proposed standard offers opportunities to extend ATV applications to the broader information technology industry and does not preclude interactive applications over cable, telephony, or wireless transmission modes.

Standards for Advanced Television, Position Statement of the Information Technology Council at 2 (Oct. 31, 1995).

²⁵ See Letter from Richard E. Wiley, ACATS Chairman, to Rick Shriner, Vice President, Apple Interactive Media (July 10, 1995).

was incorporated into the Standard approved by the Advisory Committee. No commenter seriously maintains that the Standard fails to satisfy any of these criteria.

The computer industry's participation in the ACATS process resulted in a standard that is primarily composed of progressive scan formats. Indeed, five of the six HDTV transmission formats and nine of the twelve SDTV transmission formats contemplated by the Standard use progressive scanning. Such a result should more than satisfy the computer industry's understandable desire for a standard that allows the use of progressive scanning for text and graphics.²⁶

Some in the computer industry, however, are now demanding that ATSC DTV Standard be abandoned unless the four remaining interlace formats are eliminated. EIA and the ATV Committee are frankly perplexed by the adamant opposition of these parties to the inclusion of some interlace scanning in the Standard.²⁷ The Standard, after all, contains all of the requisite elements to ensure compatibility with computers.²⁸ These parties apparently object

²⁶ EIA and the ATV Committee, however, do not believe that interlace scanning is necessarily inadequate for displaying text and graphics. At the demonstration held in conjunction with the Commission's December 1995 En Banc Hearing, the Grand Alliance illustrated that the interlace format was capable of displaying text at a very high level of resolution. Subsequently, several computer companies have announced joint ventures involving the provision of information services using DBS and other television delivery media. These ventures all use interlace scanning, and will presumably offer acceptable performance.

²⁷ In the *Notice*, the Commission acknowledges that the flexibility inherent in the Standard's multiple formats is one its greatest strengths. See *Notice* at ¶ 8 ("An attractive feature of the ATSC DTV Standard is that the appropriate format would be chosen by the broadcaster based upon the specific application for which it was used.").

²⁸ The opposition of certain computer interests to the Standard is also puzzling because the standard now before the Commission is the only one in the world that allows interoperability with computers. For example, the European DVB system uses only interlaced scanning and non-square pixels. DVB has been mandated in Europe, is being

to the fact that the Standard also meets the needs of broadcasters and others, who have consistently cited a number of reasons why interlace scanning is critical to their industries.²⁹ Many broadcasters, for example, have noted that, within a 6 MHz channel, interlaced technologies are currently superior for non-film based applications where 1,000 or more display lines are required.³⁰ EIA and the ATV Committee's puzzlement is shared by other parties, one of which has appropriately expressed amazement that some computer interests, with no significant stake in current broadcasting activities, would attempt to dictate the future technologies to be used by that industry.³¹ One can only imagine how computer interests would react "if broadcasters petitioned the FCC to regulate computer display formats" ³²

marketed globally, and has been selected for use in some U.S. DSS services. If the Commission were to delay or decline to adopt the ATSC DTV Standard, non-interoperable standards like DVB would gain a prominent position in the U.S. and world marketplace to the detriment of the U.S. computer industry.

²⁹ For a technical discussion of this topic, we refer the Commission to Sony Comments at 14-25. Some broadcasters, however, have stated their intent to transmit in all-progressive scanning as soon as cost and technology permit. EIA and the ATV Committee suggest that, after adopting the ATSC DTV Standard, the Commission may wish to work with industry in the development of a migration path to all-progressive scanning.

³⁰ See Broadcasters' Comments at 10. Many computer industry advocates refuse to acknowledge that any industry may have a legitimate interest in the inclusion of the interlace format. See, e.g., Comments of William F. Schreiber (Part II) at 1 ("the use of interlace would confer *no benefit* of any kind, monetary or otherwise, on *any* domestic stakeholder") (emphasis added).

³¹ See GI Comments at 7. See also Sony Comments at 9 ("The ATSC DTV standard is, first and foremost, a television standard.").

³² GI Comments at 7.

Notwithstanding their rhetoric, none of the computer interests has been able to identify a single compelling reason why interlace scanning should be removed from the Standard.³³ Their opposition to interlace scanning as a display format is particularly inexplicable given that the Standard applies *only* to *transmission* protocols. Neither program producers, broadcasters nor consumers will be forced to use an interlace display. The Advanced Television Test Center ("ATTC"), along with several manufacturers, has demonstrated that existing technology will allow receivers to display a wide range of scanning formats, independent of the parameters chosen for production or transmission. Even material that is transmitted in an interlaced format can be displayed by computers (or televisions using computer applications) in a progressive format or different frame rate.³⁴

By definition, standards-setting involves compromise and, as a consequence, some criticism may be inevitable. Ultimately, as one commenter has aptly pointed out, "[t]here is no rational technical resolution to this debate on interoperability *that can fully satisfy all factions*. It therefore reduces to an objective evaluation -- on the basis of practical applications -- of the many facets of interoperability compromises that have been quite cleverly built into the ATSC DTV standard."³⁵

The inclusion of some interlaced scanning capability in the ATSC DTV Standard accommodates the needs of broadcasters without disadvantaging those who favor progressive

³³ The best that CICATS can do is argue that other participants in the ATSC's consensus-driven process had "closed minds" about interlace scanning. *See* CICATS Comments at 22. Put more accurately, the computer interests' proposal that the Standard be limited to progressive scanning could not withstand peer review in a consensus-driven process.

³⁴ *See* ATTC Comments at 7.

³⁵ Sony Comments at 35.

formats. The issue, simply stated, is whether progressive scanning should be the *exclusive* format, regardless of its impact on consumers and other concerned industries. The answer, we believe, is clear. The Commission should reject as unreasonable the demand for an exclusively progressive scanning standard.

B. Concerns Regarding Aspect Ratio Are Unfounded

After years of deliberations in which both the motion picture and television production industries participated, ACATS concluded that a 16:9 aspect ratio would be best for wide-screen television programming and motion pictures. Some elements of the cinematography industry, however, now claim that a 2:1 aspect ratio would be best to display some types of wide-film formats. The Commission should reject these claims. Like the ATSC and the Motion Picture Association of America, the Commission should conclude that the 16:9 aspect ratio is the most appropriate display dimension.³⁶

Cinematographers currently use a wide variety of aspect ratios. As a consequence, no single aspect ratio would be ideal for the display of all motion pictures. The 16:9 ratio was chosen because it can accommodate the variety of widescreen film formats, as well as 4:3 film and video archival materials. Moreover, the 16:9 aspect ratio is now the

³⁶ See MPAA Comments at 2-4. MPAA is a trade association representing eight of the largest U.S. producers, distributors, and exporters of theatrical motion pictures, television programming, and home video entertainment. The 16:9 aspect ratio is also supported by the Society of Motion Picture and Television Engineers. See *Notice* at ¶ 52.

preferred global format, having been adopted by the ITU-R and standards bodies in Europe and Japan.³⁷

The aspect ratio issue also has consumer cost implications. A receiver that supports a 2:1 aspect ratio may weigh 30-50 percent more and require a 12.5 percent larger tube size than a 16:9 set of the same picture height.³⁸ The additional weight and screen size required by a 2:1 aspect ratio would make such a receiver significantly more costly than the equivalent 16:9 model. As noted by Sony -- a company involved in both the motion picture and receiver manufacturing industries -- the 16:9 aspect ratio provides the optimum balance between screen area and cost.³⁹ Further reducing the cost of 16:9 digital receivers are the economies of scale resulting from the fact that consumer electronics manufacturers are already equipped to produce 16:9 tubes, cameras, and the like. In addition, a 2:1 aspect ratio would actually reduce DTV and computer interoperability because such an aspect ratio is not defined in the Video Electronics Standards Association, Extended Display Identification Data Standard.⁴⁰

In sum, the selection of the 16:9 aspect ratio embodied in the ATSC DTV Standard was derived through extensive study and deliberation. It permits high-quality display

³⁷ The ITU-R adopted the 16:9 ratio after considerable evaluation and subjective assessments of viewer preferences of aspect ratios.

³⁸ See Broadcasters' Comments at 13.

³⁹ See Sony Comments at 30-32 ("A 2:1 (or 18:9) aspect ratio would greatly exacerbate the very critical vertical height/screen area relationship in a manner that would be prohibitively expensive from both a manufacturer's and consumers' point of view.").

⁴⁰ See Broadcasters' Comments at 14 n.22.

of all motion pictures without denying the public the benefits of cost-effective HDTV. The Commission should therefore reject requests that it adopt a different aspect ratio.

IV. MOST COMMENTERS AGREE THAT THE COMMISSION SHOULD ADOPT THE ENTIRE ATSC DTV STANDARD.

The majority of commenters in this proceeding have urged the Commission to adopt the entire ATSC DTV standard.⁴¹ A number of parties, however, have suggested that there is no need for the Commission to do so. EIA and the ATV Committee submit that adopting a partial standard would fail to provide the "measure of certainty and confidence" needed to ensure the smooth and expeditious transition to DTV.⁴²

As noted above, the ATSC DTV standard is the result of a nine-year process, during which time detailed consideration was given to the minimum requirements necessary in a DTV standard. The Standard ultimately adopted was calibrated to include only those elements necessary to provide both broadcasters and manufacturers with the information they need to go forward, yet allow for flexible usage as well as product and service differentiation. Adoption of less than the entire Standard would undo this balance and introduce uncertainty and unreliability.

Of particular concern to EIA and the ATV Committee, adoption of a partial standard would result in the emergence of myriad competing and incompatible standards.

⁴¹ See, e.g., ABSC Comments at 2-3; ATSC Comments at 6; ATTC Comments at 2; Broadcasters' Comments at 1-2; CHDTV Comments at 5; Grand Alliance Comments at 5; GI Comments at 2; Hitachi Comments at 3; OSTP Comments at 1; NTIA Comments at 2; MECA Comments at 2; Mitsubishi Comments at 2; Phillips Comments at 3; Sony Comments at 7; Thomson Comments at 4; Zenith Comments at 3.

⁴² Notice at ¶ 37.

Contrary to the claims of some in the computer industry, the adoption of a partial or stripped down "baseline" standard would force consumers to purchase multiple pieces of equipment to accommodate the innumerable variations of a partial standard. Faced with the need to purchase multiple receivers, consumers may well elect to "sit out" the transition to DTV until clear-cut winners emerge, thus delaying the investments of broadcasters, equipment manufacturers, and financial institutions. By contrast, adoption of the complete ATSC DTV Standard will give consumers the confidence to purchase digital receivers at an early stage of the transition process. This early demand will generate economies of scale that will enable manufacturers to produce and sell receivers at lower prices.⁴³

Some parties, most notably the Computer Industry Coalition on Advanced Television Service ("CICATS"), have invited the Commission to consider standards other than the ATSC DTV Standard recommended by ACATS.⁴⁴ CICATS claims that its alternative standard would "save" consumers \$50 billion over seven years. Aside from its baseless cost claims, CICATS' fundamental error lies in its "apples and oranges" comparison of its theoretical system -- which supports only standard definition transmission -- with the ATSC Standard, which allows full high definition.⁴⁵

⁴³ In his analysis of the positive externalities associated with the nearly universal use of the NTSC standard, Bruce Owen observes that "electronic goods -- consumer and commercial products -- are subject to strong economies of scale in production. Cost and prices of these items often fall dramatically with experience and increasing production volume." Owen and Wildman at 289.

⁴⁴ See, e.g., CICATS Comments at 31.

⁴⁵ As one participant aptly notes, "consumers could save billions by buying bicycles instead of automobiles, but that hardly argues for adopting an automobile standard that features two wheels and a foot-powered drive mechanism." Grand Alliance Comments at 21.

EIA and the ATV Committee have consistently maintained that HDTV is an essential element of the ATSC DTV Standard. HDTV will give the public the greatest incentive to migrate from NTSC service to DTV. HDTV will be the principal qualitative difference between today's analog service and tomorrow's digital environment. Only HDTV will provide the level of programming required for true large-screen presentation. A standard that does not include HDTV, such as that proposed by CICATS, would dampen consumer incentive and cause DTV to be stillborn.

CICATS also overlooks the fact that equipment manufacturers have every incentive to keep digital receiver costs as low as possible, because affordable prices are key to stimulating massive consumer demand. The digital television receiver industry will respond to the market by offering a wide range of products that include various combinations of performance, features, and cost. Indeed, the ATSC DTV Standard's ability to support a number of formats at almost negligible additional cost is one of its most important features, enabling it to address the multiple needs of consumers and delivery media.⁴⁶

The Commission should decline any invitations to adopt a DTV standard other than that recommended by the ATSC. The Grand Alliance system which serves as the basis of the ATSC DTV Standard is the most exhaustively researched and tested standard of its kind.

⁴⁶ CICATS' erroneous consumer cost estimates are based upon what it considers to be the complexity inherent in decoding the Standard's 18 video formats. "One of the fundamental flaws of the ACATS proposal is that its 18 video formats are unnecessarily complex and detailed . . . Such complexity and detail will increase consumer costs" CICATS Comments at 28. In fact, there are only three fundamental formats encompassed by the ATSC DTV Standard -- 1080, 720, and 480 vertical lines. The number "18" is arrived at by counting each combination of frame rate and aspect ratio associated with these vertical line rates as a different format.

The Standard is already being used for live broadcast, albeit as a pilot project, in at least one commercial station. Given the enormous challenge posed by the migration from NTSC to DTV, the adoption by the Commission of an untested standard which exists only in theory would entail a huge and unacceptable risk. To subject these newly proposed standards to the same rigorous testing as the ATSC DTV Standard would take years, delaying indefinitely the transition to DTV and squandering whatever technological lead the United States still enjoys. The Commission should also be mindful that the ATSC DTV Standard enjoys broad industry consensus. By contrast, no consensus exists regarding the alternatives proposed by the few detractors of the Standard.

The majority of parties filing comments also agree with EIA and the ATV Committee's position that there is no need to "sunset" or place a time limit on the life of the proposed standard.⁴⁷ Technological advances of the sort that would merit a revision of the Standard are inherently unpredictable. The setting of an expiration or sunset date for the Standard would not advance the Commission's goal of promoting an expeditious transition to DTV. Instead, consumers, broadcasters, and manufacturers would be discouraged from investing in a system projected by the Commission to be obsolete at a date certain. Rather than selecting an arbitrary sunset or date for future review, the Commission should assess the continuing viability of the Standard as and when needed, and make modifications as the public interest may require.

⁴⁷ See, e.g., ATTC Comments at 5; Broadcasters Comments at 24; Grand Alliance Comments at 10-12; Mitsubishi Comments at 4; Thomson Comments at 6; Zenith Comments at 6.

V. THE COMMISSION SHOULD NOT IMPOSE MANDATES UPON TELEVISION RECEIVERS.

In their comments, a number of parties have argued that receiver mandates are necessary to ensure that television receivers will be capable of receiving all formats of the ATSC DTV Standard.⁴⁸ As EIA and the ATV Committee explained in their initial comments, marketplace forces will ensure that all DTV receivers will receive all DTV formats. Moreover, given the competitive nature of the consumer electronics marketplace, manufacturers should be allowed to build sets with various display formats to allow for competitive differentiation. Simply stated, it would be suicidal for any manufacturer to bring to market -- or any retailer to sell -- a digital television set that "goes dark" upon receiving certain broadcast programming.⁴⁹ Therefore, it is wholly unnecessary for the Commission to impose any requirement that digital television receivers receive all DTV formats.

There is also no need for the Commission to adopt mandatory minimum performance specifications for DTV receivers.⁵⁰ The same competitive market dynamics that currently ensure that manufacturers produce sets with adequate reception performance will also apply to digital receivers. In this regard, a word should be added in response to the Commission's queries at paragraph 66 of the *Notice* regarding DTV receivers' technical performance. As Annex E of the Standard recognizes, the Commission's current TV rules have already been found to be appropriate for DTV service and, on a going forward basis, the

⁴⁸ See, e.g., Broadcasters' Comments at 32.

⁴⁹ "[R]eceiver manufacturers will have no choice but to design and manufacture receivers that are compatible with the transmission/distribution standards that are already selected." Owen and Wildman at 278.

⁵⁰ *Contra* Broadcasters' Comments at 33.